NASA SBIR 2018 Phase I Solicitation

A1.06 Vertical Lift Technology and Urban Air Mobility

Lead Center: GRC

Participating Center(s): AFRC, LaRC

Technology Area: TA15 Aeronautics

Urban air mobility (UAM) is a concept for immediate and flexible air transportation within a metropolitan area consisting of passenger-carrying operations. UAM passengers can select a trip origin, destination and timing without being aggregated with many other air travelers. An emerging UAM market will require a high density of vertical takeoff and landing (VTOL) operations for on-demand, affordable, quiet, and fast transportation in a scalable and conveniently-accessible â€œvertiportâ€ network. Â It is envisioned that UAM will provide increased mobility within a given metropolitan area by flying faster, and using shorter (< 100 miles) and more direct routing as compared to ground vehicles. Â UAM vehicles are assumed to require various degrees of autonomous operations to reach their full potential as the concepts are implemented and the market develops.

A series of workshops with NASA, FAA, academia, and industry were held over the past few years to discuss the potential benefits and challenges of UAM.Â The outcomes of these workshops, including technology roadmaps, are available at http://www.nianet.org/ODM/roadmap.htm. Growth of UAM is dependent on affordable, low-noise VTOL configurations, which may be enabled by electric aircraft propulsion technologies, and the ability of these vehicles to operate within densely populated urban areas in most weather conditions including low altitude operations in rain, ice, wind, and turbulence.Â

The Vertical Lift Technology and Urban Air Mobility subtopic is primarily interested in innovative technologies focused on passenger-carrying UAM vehicles that include:Â

- Development and demonstration of technologies for vertical lift Urban Air Mobility (UAM) vehicle airframes and propulsion systems, including validated modeling and analysis tools and prototype demonstrations, that show benefits in terms of operating cost, noise, safety, weight, efficiency, emissions, fuel consumption, and/or reliability based on the vehicle mission, operating environment, and system status. Examples include:
  - Reconfigurable power and energy management system technologies.
  - Distributed electric propulsion and airframe technologies and associated design tools.
  - Technologies to enable operations in most weather conditions including rain, ice, wind, and turbulence.
  - Computationally efficient modeling tools capable of modeling sound propagation in an urban environment for creating auralizations of UAM vehicles.